

Appl. No. 10/538,329
Reply to Office Action of January 29, 2008

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Amendments to the Specification:

Please replace second paragraph on page 5 with the following amended paragraph:

1) To attain the above object, one embodiment of this invention is an ink jet recording method for recording images on a base material by jetting UV-setting ink-jet ink which contains at least color materials, UV-polymeric compound, and photo-induced polymerization initiator in a water-based medium onto the base material, wherein ultraviolet rays are applied to the jetted inks within a contact time in which the rate of ink transfer to the base material is less than $20 \text{ ml/mm}^2 \text{ ml/m}^2$ (by the Bristow method).

Please replace third paragraph on page 5 with the following amended paragraph:

(2) The ink-jet recording method of (1), wherein the ink transfer rate is $20 \text{ ml/mm}^2 \text{ ml/m}^2$ or more when the contact time of the ink on the base material is 2 seconds (by the Bristow method).

Please replace second paragraph on page 6 with the following amended paragraph:

For this purpose, the ultraviolet rays should be applied

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earlier after the ink droplets hit the base material surface if the ink absorption rate of the base material is greater. In other words, the ultraviolet rays should be applied within a contact time in which the rate of ink transfer to the base material is less than $20 \text{ ml/mm}^2 \text{ ml/m}^2$, and preferably $10 \text{ ml/mm}^2 \text{ ml/m}^2$ or less.

Please replace third paragraph on page 6 with the following amended paragraph:

Further, the ultraviolet rays should be applied within a contact time in which the rate of ink transfer to the base material is $5 \text{ ml/mm}^2 \text{ ml/m}^2$ or more. If the ultraviolet rays are applied at a timing of under this contact time (less than $5 \text{ ml/mm}^2 \text{ ml/m}^2$), the ink dot sizes may be insufficient and the jetted inks may be hardened insufficiently. The ultraviolet rays can be applied immediately after the ink droplets hit the base material surface when the roughness index K_r ($\text{ml/mm}^2 \text{ ml/m}^2$, measured by the Bristow method) of the base material is $5 \text{ ml/mm}^2 \text{ ml/m}^2$ or more.

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Please replace first paragraph on page 7 with the following amended paragraph:

As defined by structure (2), if the liquid transfer rate is 20 ml/mm^2 ml/m^2 or more when the time during which the ink is in contact with the base material (as the contact time) is 2 seconds, the base material can absorb the remaining water-based medium even after the ink is hardened by the ultraviolet rays. This can reduce the drying load greatly. The preferable liquid transfer rate is 25 ml/mm^2 ml/m^2 or more.

Please replace second paragraph on page 9 with the following amended paragraph:

This invention applies ultraviolet rays to the ink within a contact time in which the rate of ink transfer to the base material (ink transfer rate) is less than 20 ml/mm^2 ml/m^2 . Finally, the ink transfer rate should preferably be 20 ml/mm^2 ml/m^2 or more when the contact time (during which the ink is in contact with the base material) is 2 seconds (measured by the Bristow method). If the ink transfer rate is less than 20 ml/mm^2 ml/m^2 , the drying load increases and any unhardened ink may contaminate the support member conveying member.

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Please replace third paragraph on page 9 with the following amended paragraph:

Although the time period between landing of an ink droplet and application of ultraviolet rays to the ink droplet should be within a contact time during which the ink transfer rate is less than 5 to 20 ml/mm^2 ml/m^2 , the time should normally be 0.01 to 5 seconds and preferably 0.01 to 2 seconds to prevent ink blurring. In other words, it is preferable that the base material absorbs more ink but more slowly.

Please replace last paragraph on page 10 with the following amended paragraph:

The timing to apply ultraviolet rays should be within a contact time at which the ink transfer rate is 20 ml/mm^2 ml/m^2 is less. If the timing is after the contact time, the ink goes deeper into the base material. As the result, the image density becomes lower and the ink is not fully hardened.

Please replace first paragraph on page 15 with the following amended paragraph:

The contact time for the ink transfer rate of 20 ml/mm^2 ml/m^2 is 1.25 seconds (measured by the Bristow method) and the liquid transfer rate for the contact time of 2 seconds is

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24 ml/mm^2 ml/m^2 .

Please replace fourth paragraph on page 15 with the following amended paragraph:

The contact time for the ink transfer rate of 20 ml/mm^2 ml/m^2 is 0.8 seconds (measured by the Bristow method) and the liquid transfer rate for the contact time of 2 seconds is 28 ml/mm^2 ml/m^2 .

Please replace last paragraph on page 15 with the following amended paragraph:

A PET film was prepared with the surface coated with a hydrophilic resin. The contact time for the ink transfer rate of ml/mm^2 ml/m^2 is 2 seconds or more (measured by the Bristow method) and the liquid transfer rate for the contact time of 2 seconds is 15 ml/mm^2 ml/m^2 .

Please replace fifth paragraph on page 16 with the following amended paragraph:

Maximum quantity of ink applied (solid printing, each color): 20 ml/mm^2 ml/m^2

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Please replace first paragraph on page 19 with the following amended paragraph:

As seen in the above test results (base material 1 of Embodiment 1 and base materials 1 and 2 of Embodiment 2), the printed images are very good when the ultraviolet rays are applied within the contact time at which the ink transfer rate of the base material is less than 20 ml/mm^2 ml/m^2 .

Please replace second paragraph on page 19 with the following amended paragraph:

The recorded materials prepared by Embodiment 2 were dried by a far-infrared heater. As the result, the images printed on base material 1, 2, and 3 were strong enough and could not be damaged by finger-rubbing. However, to increase the image strength, the base material 3 must be dried longer because the ink transfer rate for the contact time of 2 seconds is a little smaller ~~(15 ml/mm²)~~ (15 ml/m^2).